

## SECTION 413 RUMBLE STRIP

### 413.01. DESCRIPTION.

The work under this item shall consist of the production of noise generating (rumble) strips in the asphalt concrete or portland cement concrete pavement on driving lanes or the roadway shoulders. These shall be at the locations specified on the project Plans, in accordance with the details shown in the Plans or on Standard Drawings and the requirements of these Specifications.

The rumble strips shall fall into the following categories:

- **Method AC-CON** designates rumble strips formed or cut in asphalt concrete shoulders continuously as shown in the Plans.
- **Method AC-CYC** designates rumble strips formed or cut in asphalt concrete shoulders in a cyclic pattern as shown in the Plans.
- **Method PCC-CYC** designates rumble strips formed or cut in portland cement concrete shoulders in a cyclic pattern and section as shown in the Plans.

### 413.03. EQUIPMENT.

- (a) **Method AC-CON or Method AC-CYC.** A roller may be modified to produce the desired rumble strip and pattern acceptable to the Engineer. With the Engineer's approval, the strips may also be machine cut or routed after final finishing is complete.

- (1) **Roller formed.** The roller to be used shall be of the self-propelled vibratory type and shall weigh at least 6 tons ( 5.4 metric tons). If the rear tires are pneumatic, they shall have a smooth or slick-head design. The roller shall be equipped with an approved water system which will moisten the drums and tires so that the bituminous material will not be picked up. The roller shall also be equipped with an approved guide that extends in front of the roller and is clearly visible to the operator so that proper alignment of the strips will be obtained.
- (2) **Machine cut or routed.** The machine approved by the Engineer will produce clearly incised grooves within the pattern and dimensional tolerances as shown on the details or Standard Drawing. Grooving may be accomplished with a single pass multi-cutter machine or multiple passes of a single cutter machine as long as the intended grooving is produced.

- (b) **Method PCC-CYC**

The plastic portland cement concrete may be formed to produce the desired rumble strip and pattern acceptable to the Engineer. With the Engineer's approval, the strips may also be machine cut or routed after final finishing is complete.

- (1) **Formed.** Form the rumble strips in the plastic portland cement concrete by hand floating or by blocking out the area and grouting a precast patterned block in place.
- (2) **Machine cut or routed.** Form strips as specified in Subsection 413.03(a)(2).

**413.04. CONSTRUCTION METHODS.**

- (a) **Asphalt Concrete Shoulders Or Mainline Pavement.** When forming or machine cutting (routing) in asphalt, produce indentations in accordance with the details shown in the Plans or the Standard Drawing(s). Position the roller by using planking or by other approved means so that the asphalt concrete is indented only at those locations specified on the project plans. Form the rumble strips in one or more repeating passes of the roller while it is in the vibratory mode and the asphalt concrete is hot.
- (b) **Portland Cement Concrete Shoulders Or Mainline Pavement.** When forming rumble strips by any method—hand forming, blockouts for precast blocks, or machine cutting (routing)—produce strips meeting all detail requirements for spacing, length, depth, and rumble section as shown in the Plans or on the Standard Drawing(s).

**413.05. METHOD OF MEASUREMENT.**

Rumble strips of the various classifications shall be measured as follows:

- **Method AC-CON:** *Asphalt concrete continuous* will be measured by the linear foot (meter) along the longitudinal centerline or lane baseline rounded to the nearest foot ( meter).
- **Method AC-CYC:** *Asphalt concrete cyclical* will be measured by each group of recurring grooves, as shown on the plans. Only those groups meeting dimensional tolerances as shown on the plans will be measured for payment.
- **Method PCC-CYC:** *Portland cement concrete cyclical* will be measured by each group of recurring grooves, as shown on the plans. Only those groups meeting dimensional tolerances as shown on the plans will be measured for payment.

**413.06. BASIS OF PAYMENT.**

Accepted quantities of shoulder or mainline pavement rumble strips shall be paid for at the contract unit price as follows:

(A) RUMBLE STRIP-METHOD AC-CON.....	LINEAR FOOT (METER)
(B) RUMBLE STRIP-METHOD AC-CYC(GROUP).....	EACH
(C) RUMBLE STRIP-METHOD PCC-CYC(GROUP).....	EACH

Such payment amount shall be full compensation for furnishing all equipment, labor, and incidentals necessary to complete the production of mainline pavement or shoulder rumble strips (grooves) as shown in the plans or on the Standard Drawing(s).

## **SECTION 414**

### **PORTLAND CEMENT CONCRETE PAVEMENT**

**414.01. DESCRIPTION.**

This work shall consist of constructing a jointed pavement composed of portland cement concrete (P.C.C.), with or without reinforcement or continuously reinforced pavement, as specified, on a prepared base course in accordance with these Specifications and in reasonably close conformity with the lines, grades, thicknesses, and typical cross sections shown on the Plans or established by the Engineer.